

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-11. (Canceled)

12. (Currently Amended) A blazed diffractive optical element of the binary type, comprising:

~~one or more optical zones, one zone~~ at least one optical zone comprising binary microstructures with a variable fill factor etched ~~on the~~ on a surface of an optical material having a given index, forming an artificial material with effective index variation whose effective index varies between a minimum value and a maximum value of said element,

wherein at least one optical zone of said element forms a composite artificial material comprising, in a first portion, microstructures according to a first pillar type geometry for which the effective index decreases with the fill factor in a direction on said surface and, in a second portion, microstructures according to a second hole type geometry for which the effective index increases with the fill factor, ~~factor in the same direction;~~

wherein the minimum and maximum effective indices of the composite material are determined from curves of variation in the effective index due to the fill factor of the microstructures, the effective indices being obtained at the design wavelength  $\lambda_0$  and at a wavelength  $\lambda_\infty$  which is large compared with the design wavelength  $\lambda_0$ , so as to obtain an optimum value greater than 0 for a characterization parameter  $\alpha$  of said one optical

zone, said parameter being given by the equation:  $\alpha = \frac{(\delta n_{\min} - \delta n_{\max})}{\Delta n(\lambda_0)}$ , where

$\Delta n(\lambda_0) = n_{\max}(\lambda_0) - n_{\min}(\lambda_0)$ ,  $\delta n_{\min} = n_{\min}(\lambda_0) - n_{\min}(\lambda_\infty)$  and  $\delta n_{\max} = n_{\max}(\lambda_0) - n_{\max}(\lambda_\infty)$ , where  $n_{\max}$  and  $n_{\min}$  are respectively the values of the maximum and minimum effective

index at a particular wavelength:

such incident light is diffracted in a single diffraction order, i.e., the blaze order,  
and the fill factors of said microstructures according to the first and second geometries  
are defined as a function of the dispersion of said material with the wavelength in the  
first portion and the second portion, so as to obtain an element blazed over a wide  
spectral band.

13. (Canceled)

14. (Currently Amended) The optical element as claimed in ~~claim 13~~claim 12,  
~~comprising one or more zones wherein at least one optical zone is~~ formed only by  
microstructures according to either the first or second geometry.

15-16. (Canceled).

17. (Currently Amended) The optical element as claimed in ~~claim 13~~claim 12,  
corresponding to a binary synthesis of an échelette grating having a determined period  
 $\Lambda$ , wherein each optical zone of the microstructure corresponds to an echelon of the  
échelette grating.

18. (Currently Amended) The optical element as claimed in ~~claim 13~~claim 12,  
wherein each optical zone of said element corresponds to a zone of a Fresnel lens.

19. (Currently Amended) The optical element as claimed in ~~the preceding claim 18~~,  
~~wherein the~~wherein at least one optical zone is defined to have  $0.3 \leq \alpha \leq 0.5$ .

20. (Original) An optical system for use in imaging with a wide spectral band or in a  
dual spectral band, comprising a diffractive optical element as claimed in claim 13.

21. **(Currently Amended)** The optical system<sub>1</sub> as claimed in ~~claim 19~~claim 20, configured for infrared imaging.

22. **(Currently Amended)** The optical system<sub>1</sub> as claimed in ~~claim 19~~claim 20, configured for imaging in the visible spectrum range.